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# Grid Operations

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HEPiX

October 22, 2004

# Agenda



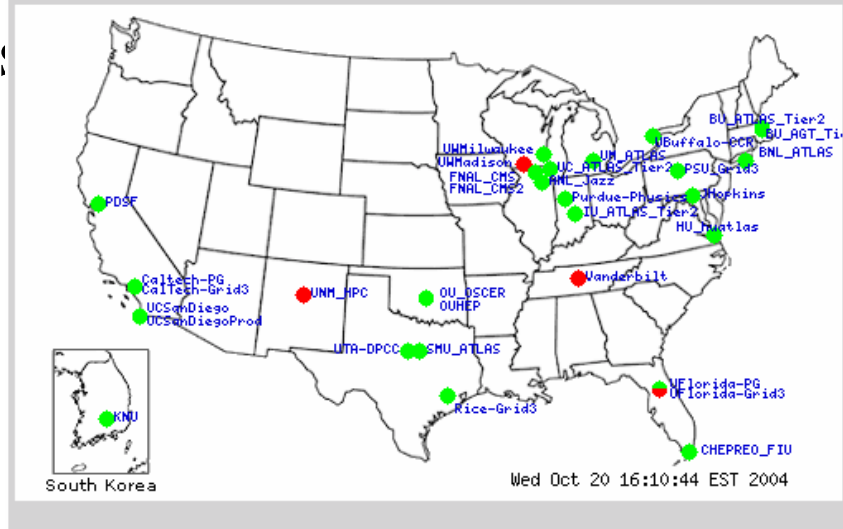
- Introduction to iVDGL and Grid3

<http://www.ivdgl.org/grid3>

- Efforts, Accomplishments and Lessons Learned
- Future Directions

## Current Site Status

Click on a site for detailed information



Please report problem on Grid3 to the IGO's trouble ticket system. A link to the main page is provided here.

## Grid3 Monitoring



### Site Status Catalog

Operational status of Grid3 sites

### MonALISA

A distributed monitoring service using JINI/JAVA and WSDL/SOAP

### Ganglia

A distributed monitoring service based on multicast listen/announce protocol.

### ACDC Job Monitor

Grid3 real-time job monitoring tool

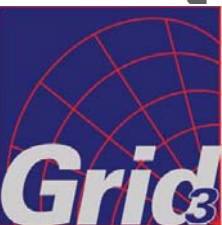


**Mission:** Deploy, maintain, and operate Grid3 as a NOC manages a network, providing a single point of operations for configuration support, monitoring of status and usage (both current and historical), problem management, support for users, developers and systems administrators, provision of grid services, security incident response, and maintenance of the Grid3 information repository.

**Staffing:** 2 FTE supported at Indiana University, additional effort also from University of Chicago and University Florida at Gainesville.

## Proposed Areas of Research:

- ❑ Access control and policy - Security
- ❑ Trouble Ticket System - Problem coordination
- ❑ Configuration and Information Services
- ❑ Health and Status Monitoring
- ❑ Experiment Scheduling



# Grid3: an application grid laboratory



CERN LHC- USCMS  
testbeds & data challenges

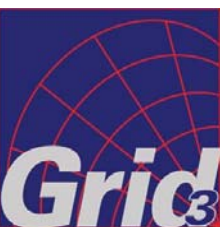
CERN LHC: US ATLAS  
testbeds & data challenges

Continuous Operations  
since deployment in  
September 2003

Successfully upgraded  
VDT during June 2004

end-to-end  
HENP  
applications

virtual data grid laboratory

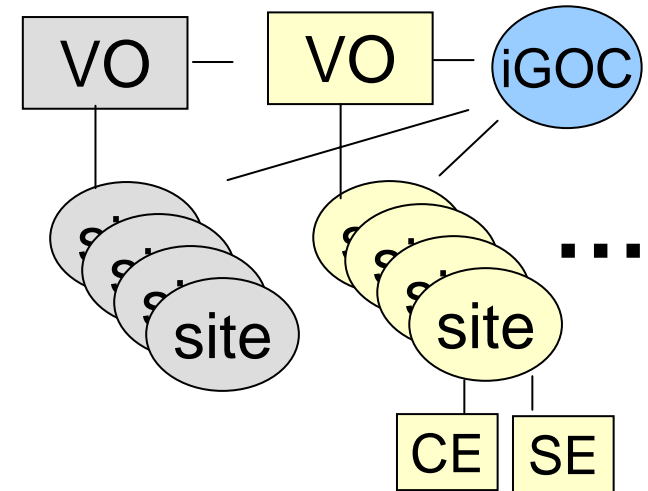


# Grid3 Design



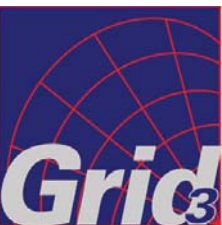
- Simple approach:

- Sites consisting of
  - Computing element (CE)
  - Storage element (SE)
  - Information and monitoring services
- VO level, and multi-VO
  - VO information services
  - Operations (iGOC)



- Minimal use of grid-wide systems

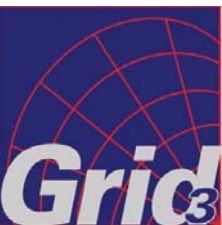
- No centralized workload manager, production replica or data management catalogs, or command line interface
  - higher level services are provided by individual VO's



# Resource Monitoring



- Ganglia
  - ❑ Open source tool to collect cluster monitoring information such as CPU and network load, memory and disk usage
- Mona LISA
  - ❑ Monitoring and Archiving tool to support resource discovery, access to information and gateway to other information gathering systems
- ACDC Job Monitoring System
  - ❑ Application using grid submitted jobs to query the job managers and collect information about jobs. This information is stored in a DB and available for aggregated queries and browsing.
- Metrics Data Viewer (MDViewer)
  - ❑ analyzes and plots information collected by the different monitoring tools, such as the DBs at iGOC.
- Globus MDS
  - ❑ Grid3 Schema for Information Services and Index Services for Information services
- GridCat
  - ❑ Graphical display of middleware testing results, provides Site database repository also include extended functions for storage, retrievable configuration and human contacts.



# Agenda



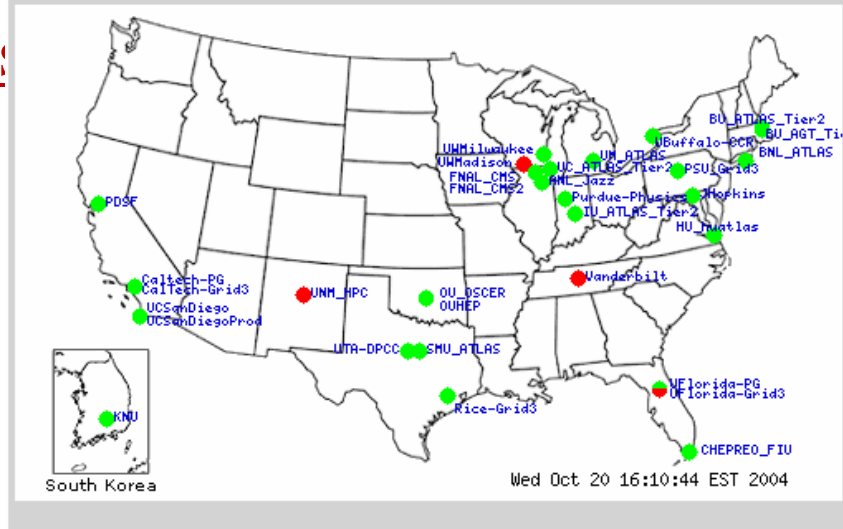
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# Structural Overview

## The operations group

- sets up and maintains a **cooperative grid community**
- facilitates coordination of work to and among responsible agents
- has no direct control: uses notification with follow-ups

## Cooperative and mentoring principles are employed:

- Identifies community vision -- I.E. the Project Plan
- Utilizes a participatory decision making process -- Taskforce
- Makes clear agreements -- Service Descriptions and MOUs
- Makes clear communication and conflict resolution a **priority** --

Weekly operations (problem solving) and management teleconference meetings.



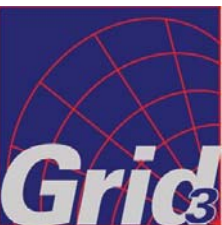
# Analysis of Effort by Area

- All issues relating to **Resource Owners and Providers** (60%)
- Special issues for **Virtual Organizations** (VO's) (20%)
- Issues related to **developers of applications** and workflow environments (portals) (10%)
- Support to **individuals** using Grid Resources (10%)

# Distribution and Production Areas



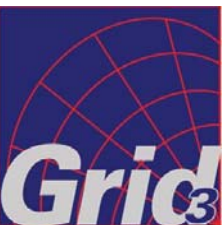
- Facilitate and support communications:
  - ❑ Direct email with Site Administrators and Grid Users
  - ❑ Web page resources
  - ❑ Status reporting to mailing list
- Coordinate and track:
  - ❑ Problems
  - ❑ Changes (Software updates, Resource Additions)
  - ❑ Security incidents
  - ❑ Requests for assistance
- A common face to collaboratively-provided support
- Maintain the versioned and historical software packages
- Provide software not supported by VDT packages
- End to End Troubleshooting for Resources



# Distribution and Production Areas



- Provide operational services which allow provide applications with the “instruments” to execute
  - Publish Site policies and environment
  - Current fabric monitoring
  - Provide status of grid middleware on sites
  - Provide current and archived job queue data for compute resources
  - Security and VO management services
  - Monitoring and monitoring archives



# iGOC ATLAS Data Challenge 2 Service Support



**iGOC contact information:** 24x7, [igoc@ivdgl.org](mailto:igoc@ivdgl.org), 317-278-9699

**BNL Operation Center:** M-F 9AM-12AM EDT, 631-344-5480

## Contents

- [Introduction](#)
- [Problem Reporting and Discovery](#)
- [Inventory and Description of Sites, Services, and Component Systems](#)
- [Monitoring Methods](#)
- [Test Methods](#)
- [Problem Response](#)
- [Problem Tracking](#)
- [Contact Information](#)
- [Administrative Escalation Procedures](#)
- [Operations Reports](#)
- [Ancillary Documentation and Communications](#)

## Introduction

The Indiana University based Grid Operation Center (iGOC) provides operations services for participating sites of the US ATLAS Data Challenge 2 (DC2). Services include monitoring, problem notification, tracking, and reporting, covering hours when sites are not staffed, thereby providing DC2 with 24x7 support for critical production hardware and services.

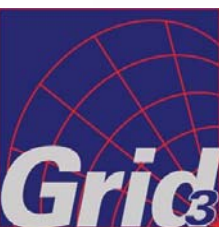
## Problem Reporting and Discovery

Problems are typically discovered by iGOC technicians via observation of monitoring systems. Additionally, problems may be reported to the iGOC from end-users or others via the [trouble ticket submission webform](#), e-mail ([igoc@ivdgl.org](mailto:igoc@ivdgl.org)), web-based or phone (317-278-9699). The hours of iGOC service provided to each site is according to the [Site Coverage Schedule](#), however, the iGOC will promptly handle all matters reported to it regardless of time of day.

Provided 24x7  
monitoring and  
problem discovery  
during Atlas DC2

Successfully  
interoperated with  
BNL Tier1 Support  
Center

Provided research  
advancements  
toward Grid to VO  
operations  
coordination

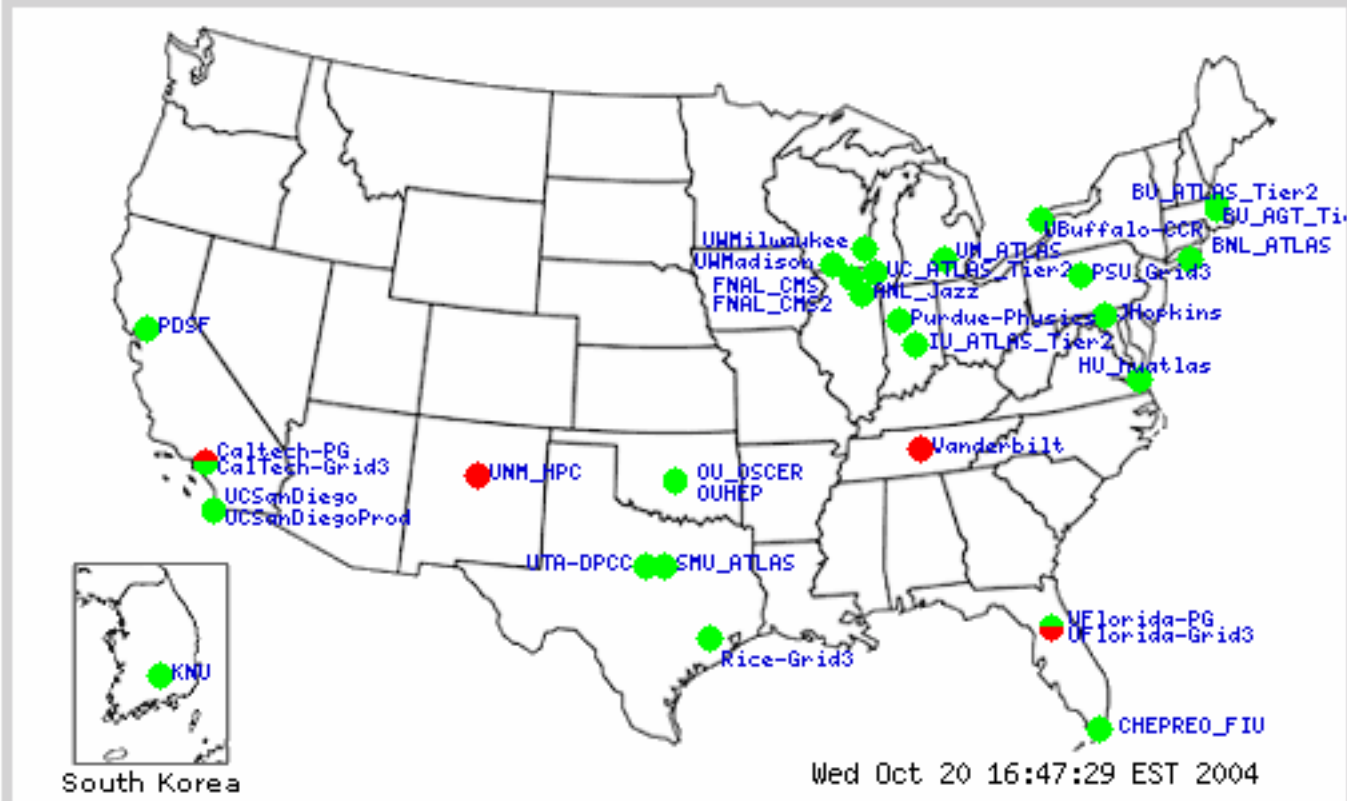


# iGOC Daily Use Case



## Current Site Status

Click on a site for detailed information



# Following up on a “Red” Status



	<b>UM_ATLAS</b>			CS	MI	UMICH	12
Authentication:	GRAM Authentication test failure: the connection to the server failed (check host and port)					2004-10-20 12:14:04 GMT	
Hello World:	UNKNOWN					2004-10-20 12:14:24 GMT	
Long Job:							
-Batch Query:	UNKNOWN					2004-10-20 00:00:00 GMT	
-Batch Sub:	UNKNOWN					2004-10-20 12:14:04 GMT	
-Batch Cancel:	UNKNOWN					2004-10-20 00:00:00 GMT	
gsiftp:	UNKNOWN					2004-10-20 00:00:00 GMT	
	<b>UNM_HPC</b>			CS	NM	UNM	516
Authentication:	Timed Out					2004-10-20 12:34:38 GMT	
Hello World:	UNKNOWN					2004-10-20 12:37:48 GMT	
Long Job:							
-Batch Query:	UNKNOWN					2004-10-20 00:00:00 GMT	
-Batch Sub:	Timed Out					2004-10-20 12:31:27 GMT	
-Batch Cancel:	UNKNOWN					2004-10-20 00:00:00 GMT	
gsiftp:	UNKNOWN					2004-10-20 00:00:00 GMT	
	<b>UTA-DPCC</b>			CS	TX	UTA	158
Authentication:	GRAM Authentication test failure: the connection to the server failed (check host and port)					2004-10-20 12:18:12 GMT	
Hello World:	UNKNOWN					2004-10-20 12:18:32 GMT	
Long Job:							
-Batch Query:	Pass					2004-10-20 07:49:41 GMT	
-Batch Sub:	UNKNOWN					2004-10-20 12:18:11 GMT	
-Batch Cancel:	Pass					2004-10-20 07:49:42 GMT	
gsiftp:	Pass					2004-10-20 07:50:38 GMT	












GITS Test

Test Time





Project Totals			
<a href="#">Open</a>	0	<a href="#">Requests</a>	0
<a href="#">Active</a>	22	<a href="#">Internal Solutions</a>	0
<a href="#">Closed</a>	669	<a href="#">Public Solutions</a>	0

Active Tickets for iGoc				
Display	<input type="text" value="My Assignments"/>		 Refresh	Match
<a href="#">Ticket #</a>		<a href="#">Priority</a>	<a href="#">Assigned To</a>	<a href="#">Last Edited On</a> 
<a href="#">692</a>		Normal	<input type="text" value="Rob Quick"/>	10/20/2004
<a href="#">691</a>		Normal	<input type="text" value="Rob Quick"/>	10/20/2004
<a href="#">685</a>		Normal	<input type="text" value="Rob Quick"/>	10/19/2004
<a href="#">520</a>		Normal	<input type="text" value="Leigh Grundhofs"/>	10/19/2004
<a href="#">501</a>		Normal	<input type="text" value="Rob Quick"/>	10/19/2004
 <a href="#">475</a>		Normal	<input type="text" value="Rob Quick"/>	10/19/2004
<a href="#">693</a>		Normal	<input type="text" value="Rob Quick"/>	10/19/2004
<a href="#">638</a>		Normal	<input type="text" value="Rob Quick"/>	10/19/2004

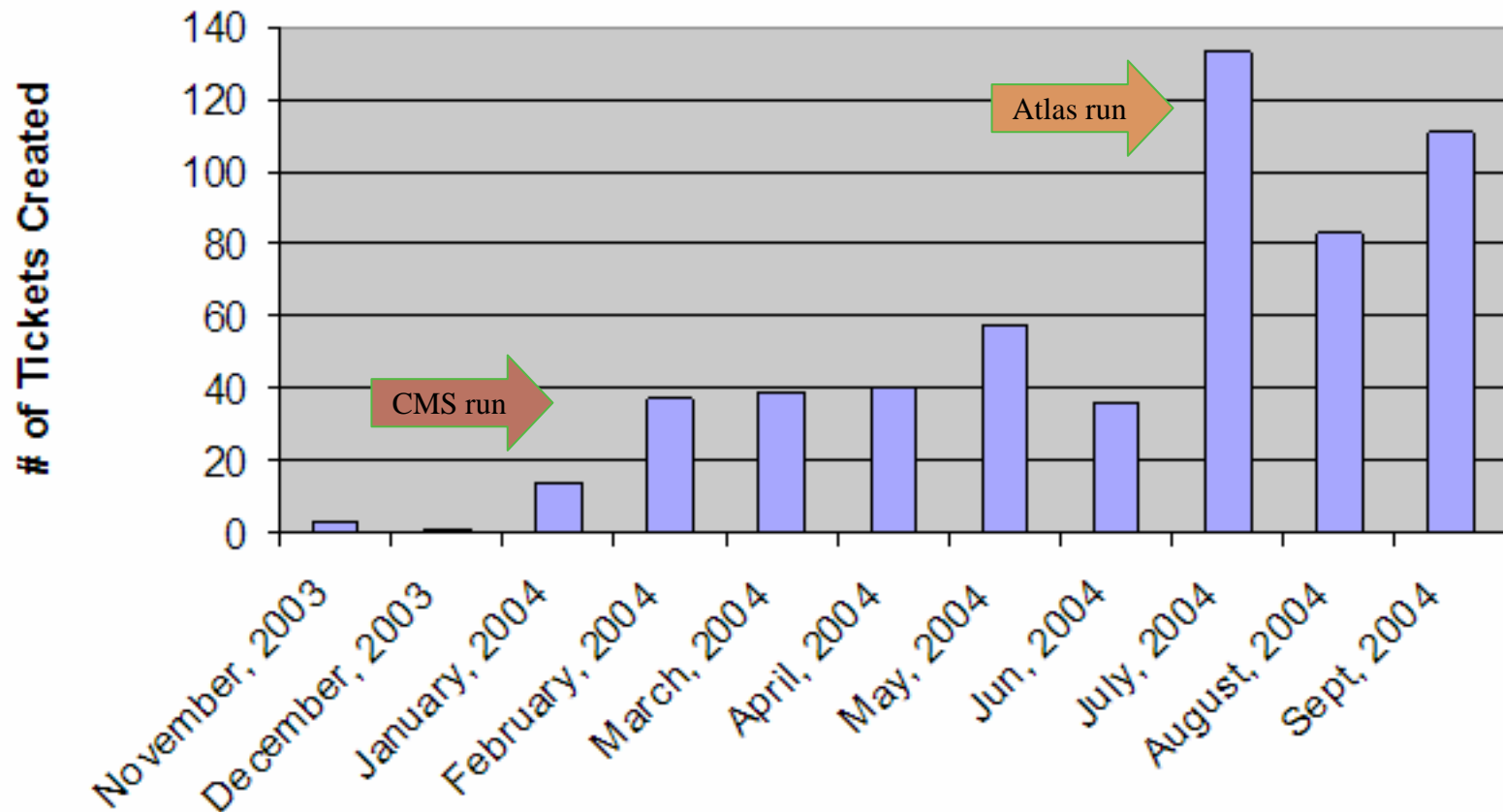
Nearly 700  
tickets  
created since  
Jan 2004

22 open tickets

# Ticket Creation since Nov. 2003



## Tickets Created by Month

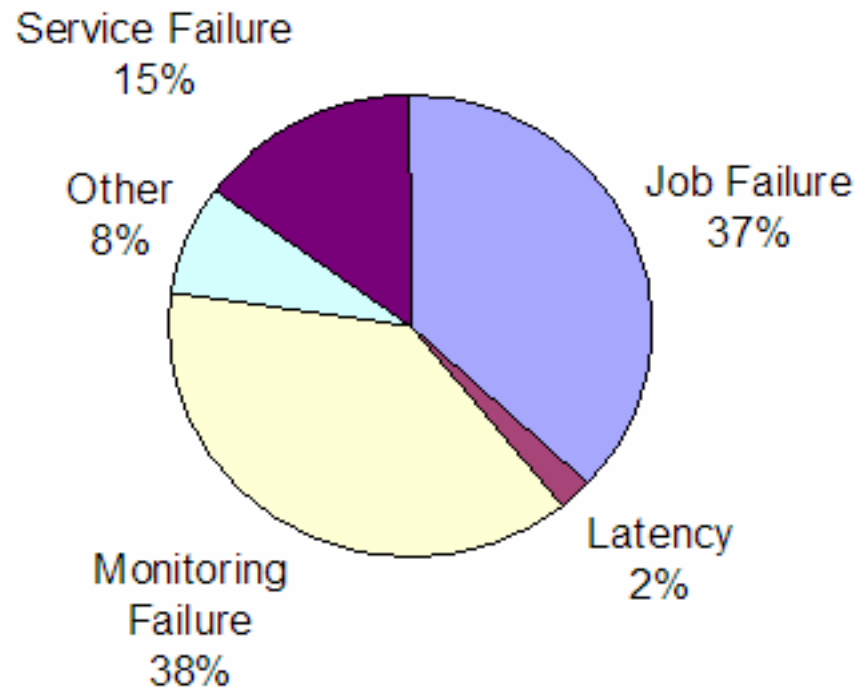




# Grid3 TT Handling by Type



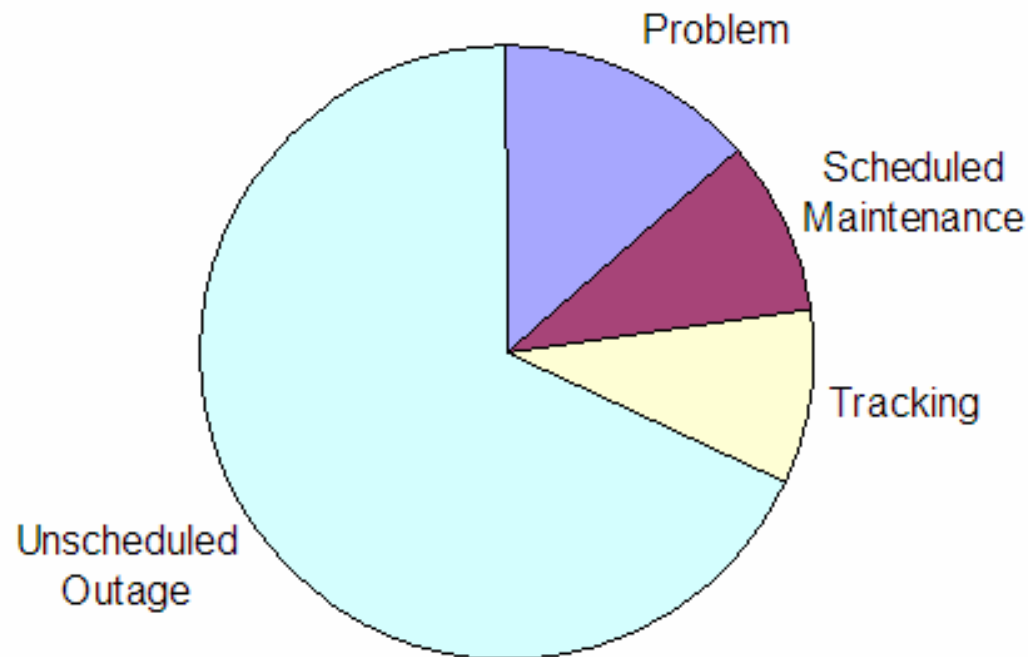
## Breakdown of Problem Tickets



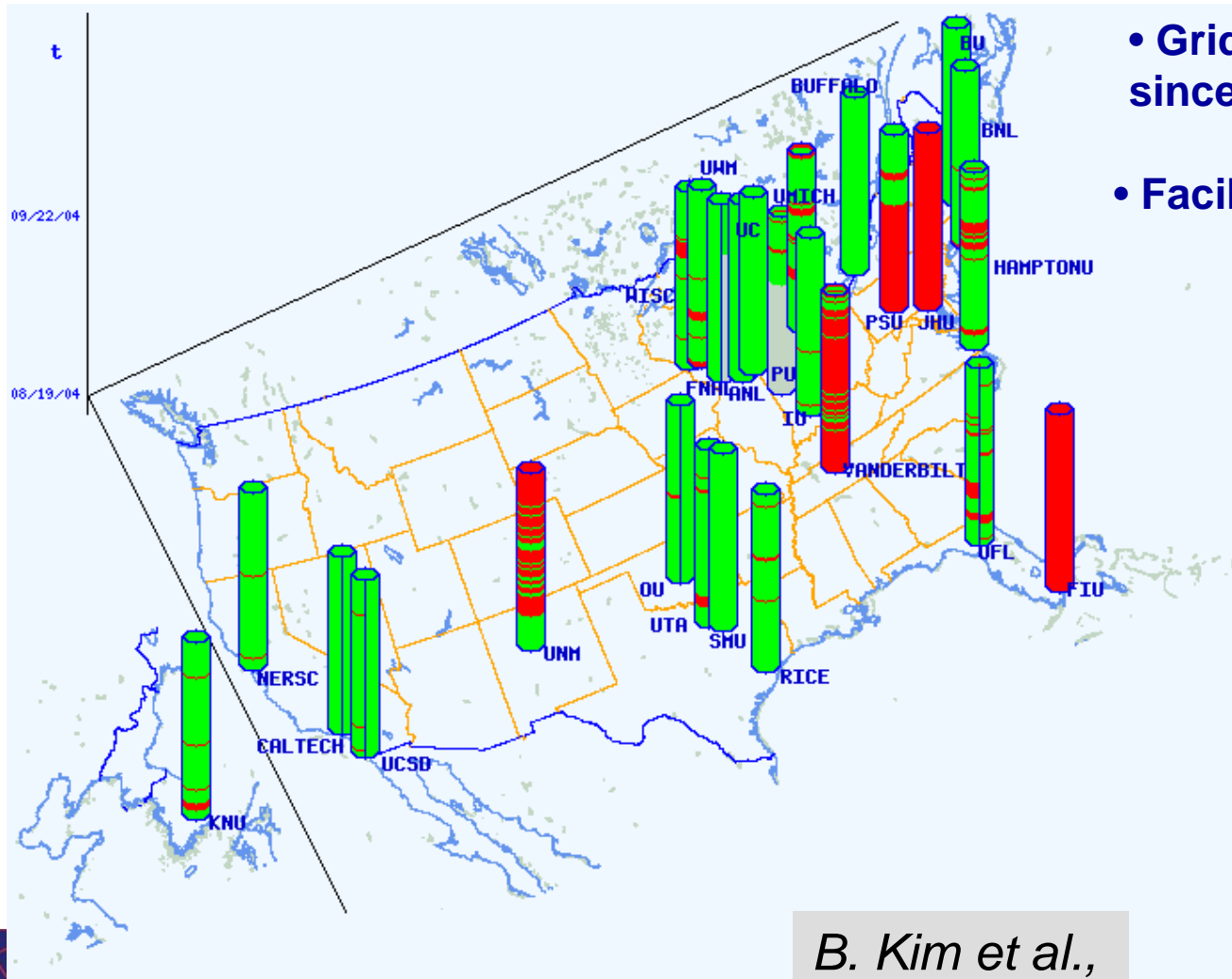
# Atlas DC2 TT Handling by Type



## ATLAS DC2 Ticket Types



# Catalog Site History Analysis



- Grid3 status collected since 08/19/04

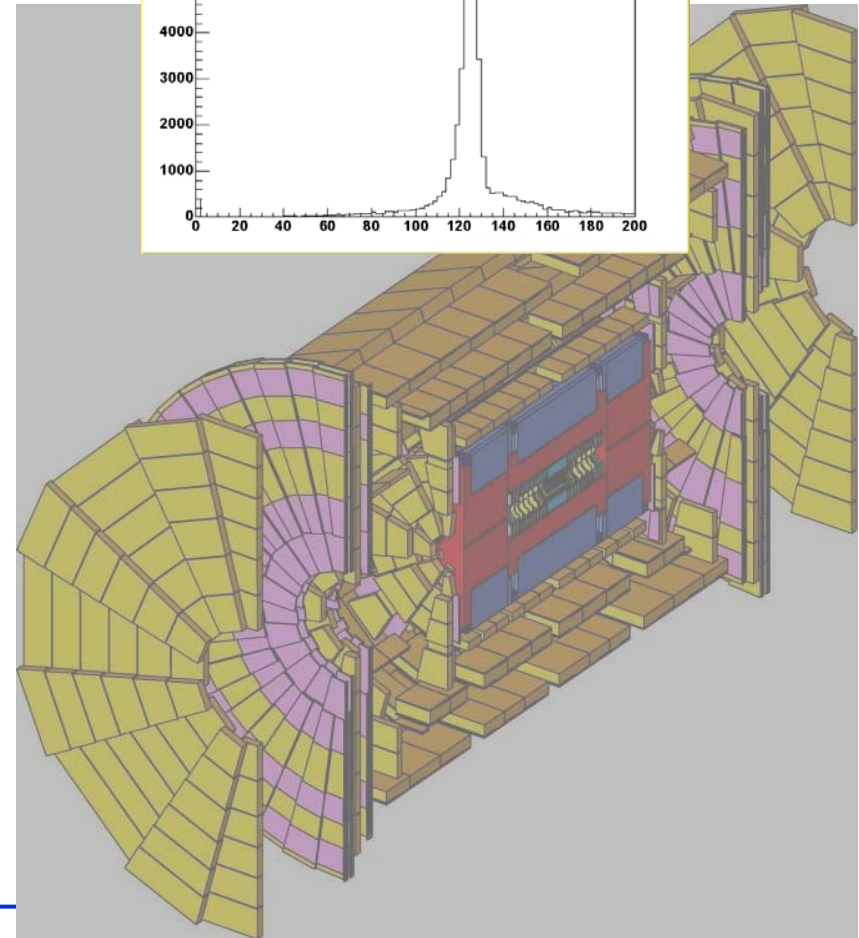
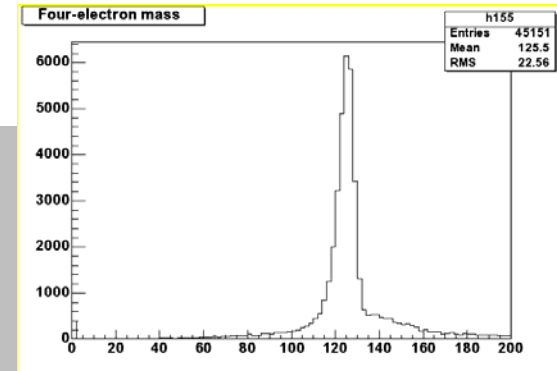
- Facility:  $\geq 1$  sites

*B. Kim et al.,*

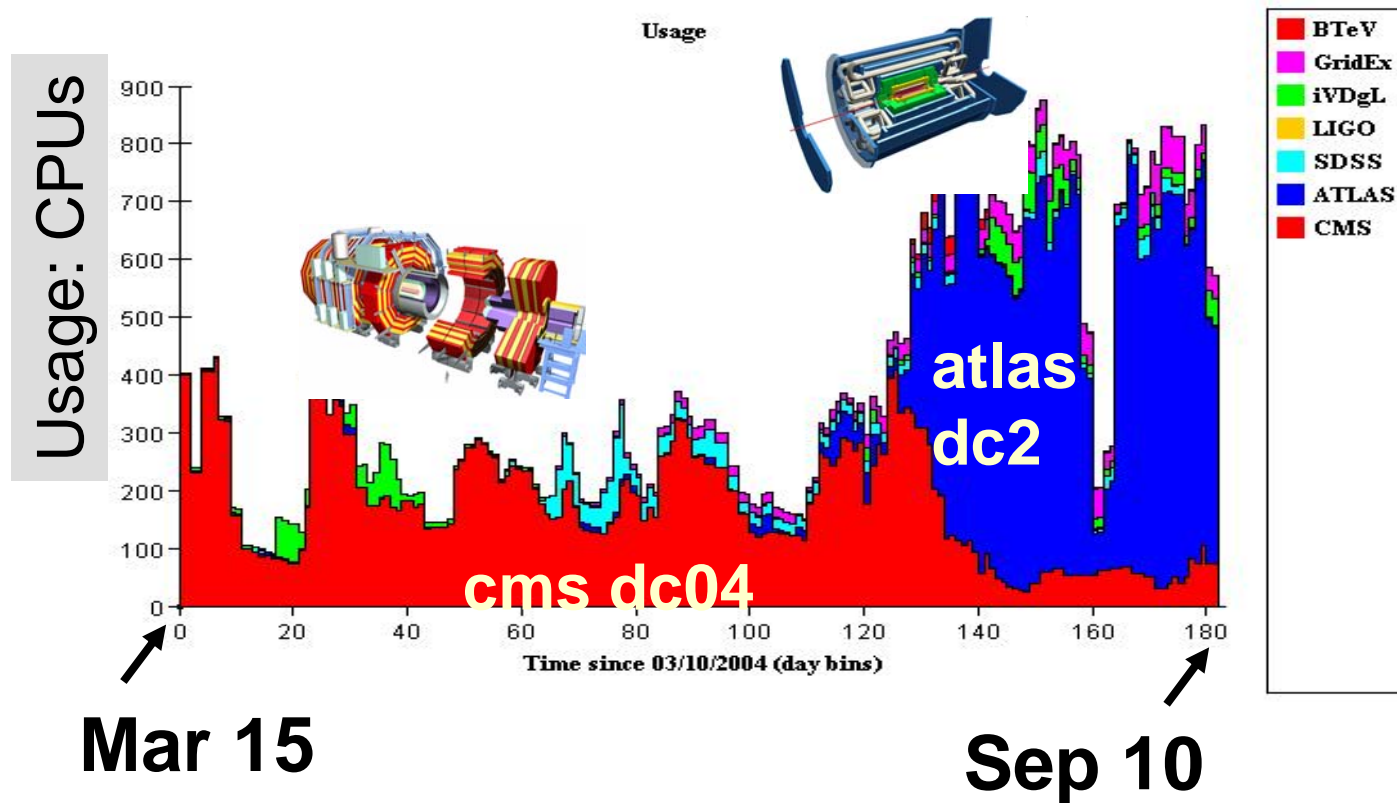
# Use of Grid3 – led by US LHC



- 7 Scientific applications and 3 CS demonstrators
  - A third HEP and two biology experiments also participated
- Over 100 users authorized to run on Grid3
  - Application execution performed by dedicated individuals
  - Typically ~few users ran the applications from a particular experiment



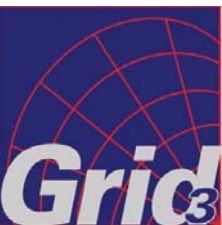
# Usage of the Grid3 (6 months)



# Lessons Learned



- Configuration management efforts in the development and deployment areas are rewarded many times over during production.
- Middleware updates can be painless
- Certificates are a hassle (just like all security)
- Not all resource information should be public
- A monitoring infrastructure allows a significant problem solving advantage, esp. redundant monitoring.



# Agenda

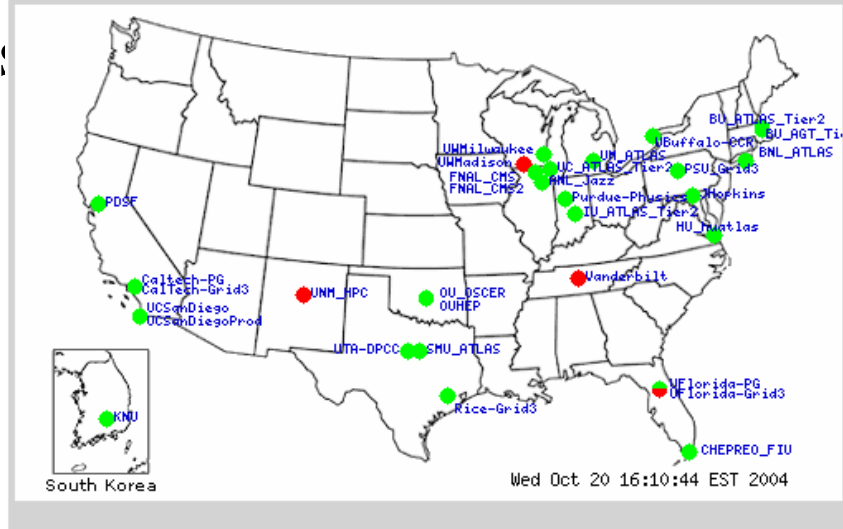


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# Grid3 is evolving into OSG



## ■ Main features/enhancements

- ❑ Storage Resource Management
- ❑ Improve authorization service
- ❑ Add data management capabilities
- ❑ Improve monitoring and information services
- ❑ Service challenges *and interoperability with other Grids*

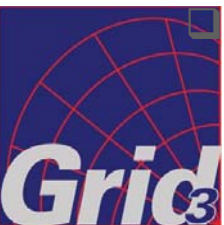


## ■ Timeline

- ❑ Current Grid3 remains stable through 2004
- ❑ Service development continues

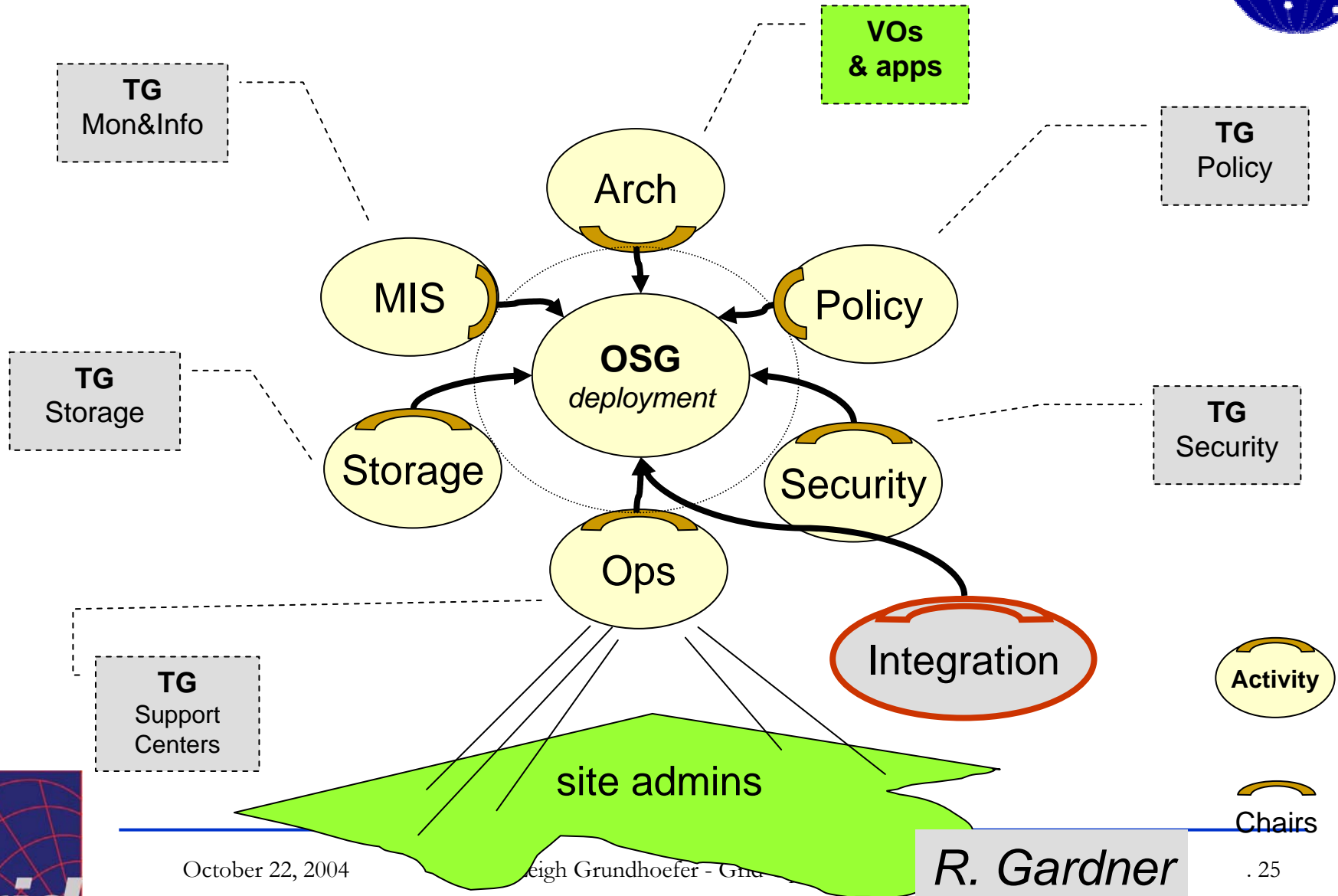
Grid3dev platform

*c.f. R. Pordes*





# OSG deployment landscape



# Support Centers Technical Group

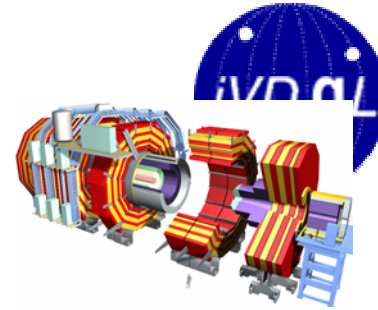


- is responsible for discussing and coordinating the OSG activities that relate to support centers and services. These services include:
  - ❑ definition of the support model for user, infrastructure, service and technology support.
  - ❑ communication and publication of information for support helpdesk and trouble ticket infrastructures.
  - ❑ communication and interoperation with other grid infrastructures, in particular the LCG/EGEE.

THE END

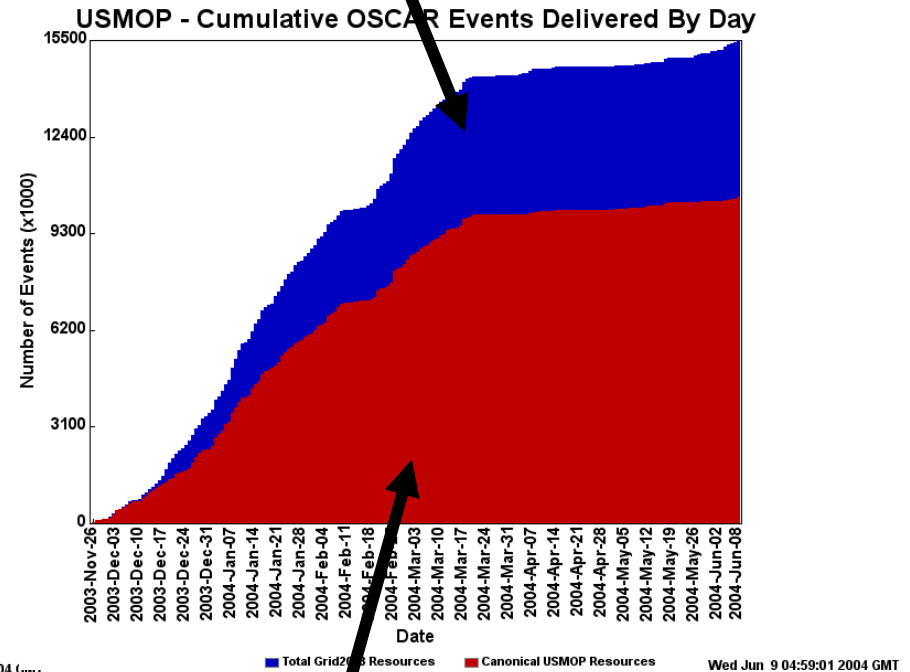
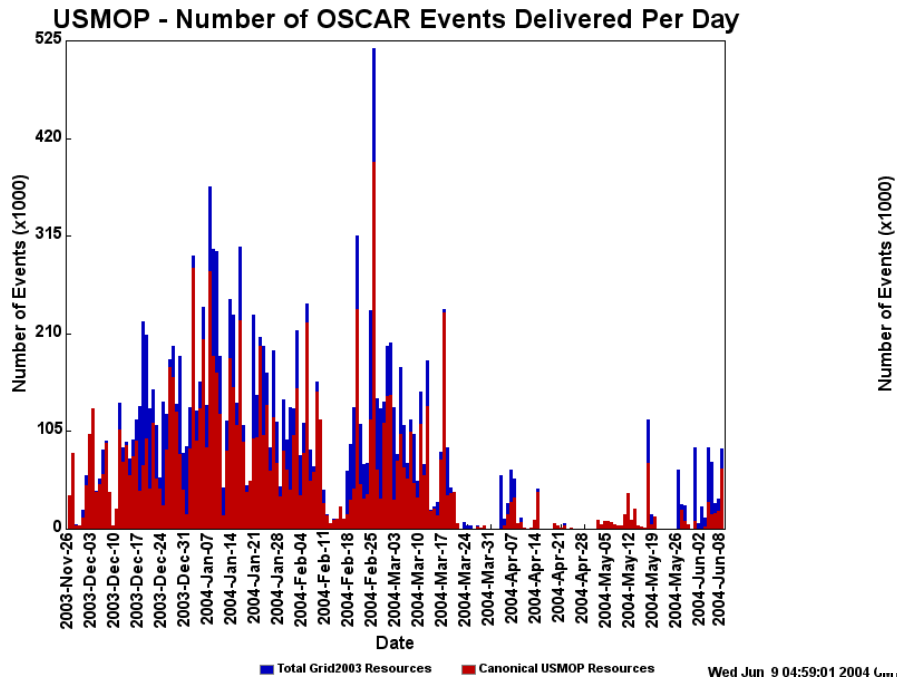
# EXTRA SLIDES

# US CMS Data Challenge DC04



## Opportunistic use of Grid3

non-CMS (blue)



Events produced  
vs. day

CMS dedicated (red)

October 22, 2004

*c.f. A. Fanfani, #497* ations

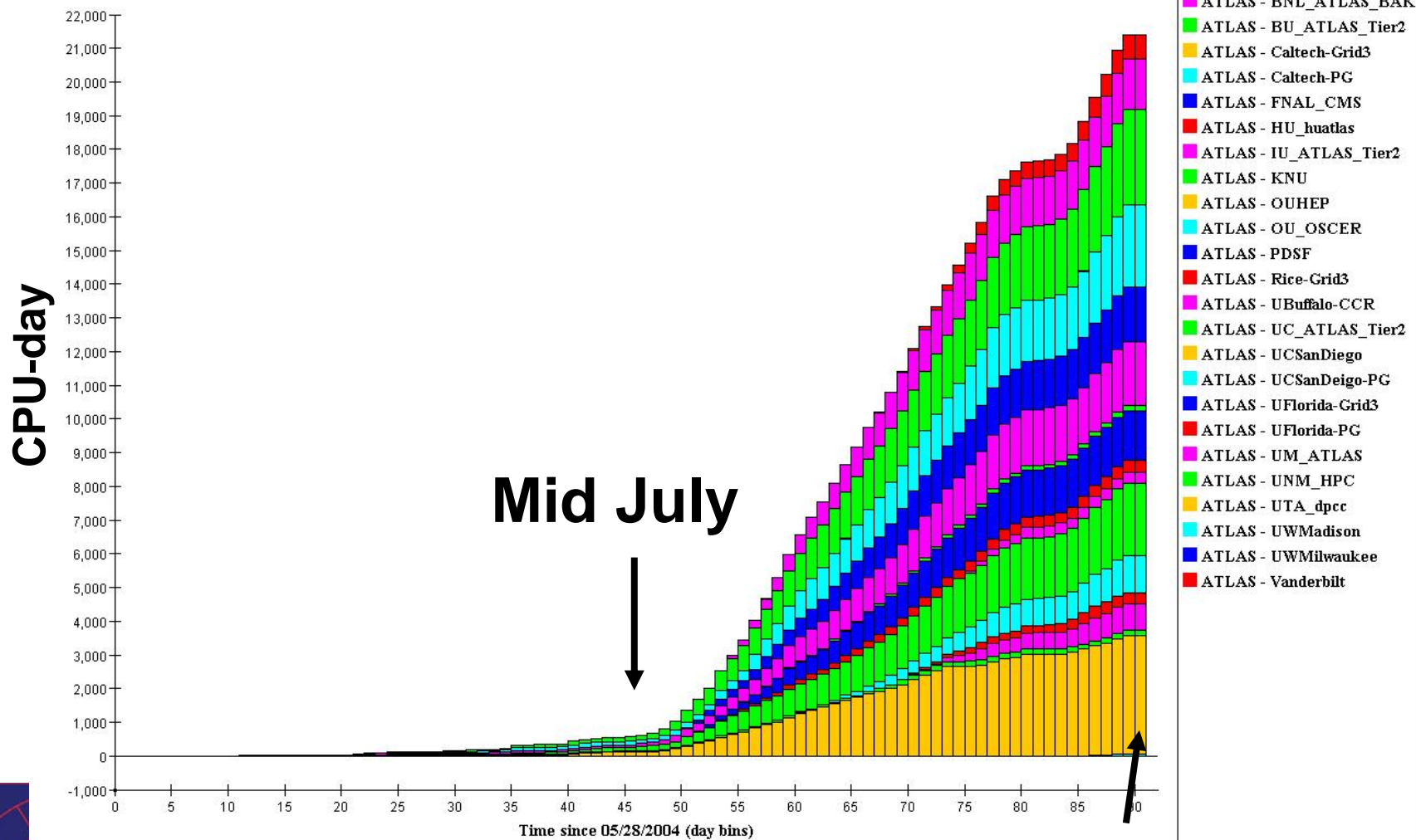
. 29



# Ramp up ATLAS DC2



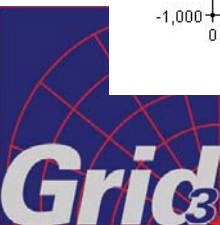
CE Usage, per VO, per Site for ATLAS



*c.f. R. Gardner, et al.,*

Grundhoefer - Grid Operations

**Sep 10**



# Resource Owners and Providers



- ❑ Pre-installation configuration ( cluster configuration review/ batch queuing/ distributed file system)
- ❑ Software installation
- ❑ Configuration management
- ❑ Outages
- ❑ Capacity planning for storage
- ❑ Policy statement for CPU resources
- ❑ Policy enforcement
- ❑ Network and system performance

# Virtual Organization Issues

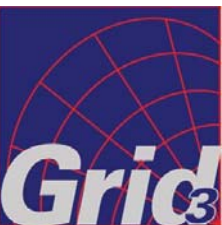
- ❑ Adjustable trouble handling procedures
- ❑ 24x7 monitoring of specialized services
- ❑ Ratings for response levels of services “Critical”, “Elevated”, etc.
- ❑ Monitoring of VO’s grid services such as VOMS



# Application Developers



- ❑ Provide specialized services for applications
- ❑ Create APIs to obtain published information from Site Resources
- ❑ Provide a liaison between VDT developers and Application developers
- ❑ Grid3 schema to publish file system location information for dynamic application installation



# Support of Individual Grid users



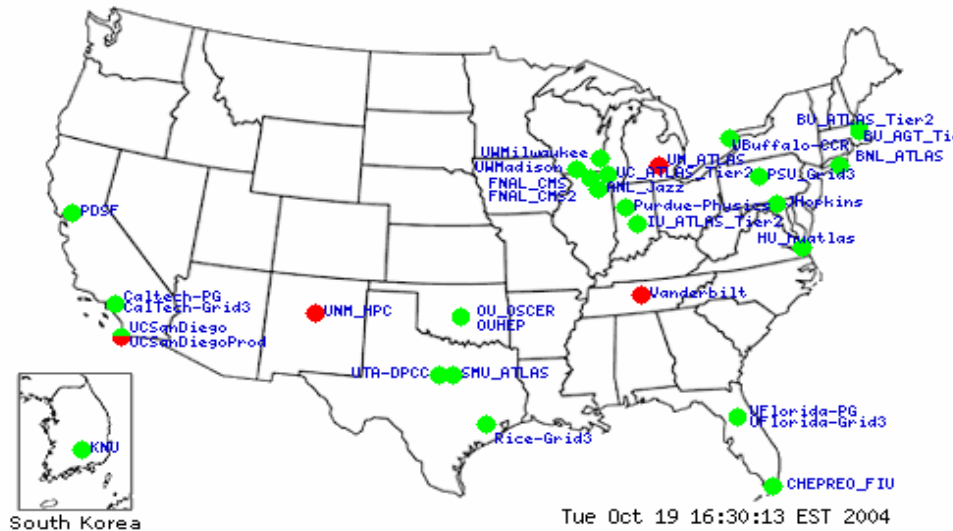
- How to get and maintain a cert
- How to run an application
- What site policies are in place
- How to use monitoring tools
- Troubleshooting application failures
- Managing datasets
- Joining a VO

# Catalog -- Site Status



Catalog of Grid3 Production Sites

- Status map on the
- Facility--> Sites
- Grid test results clickables
- Dynamic CPU/Disk info
- Optional views: different information
- Map : US-Korea map or Worldmap <- New release

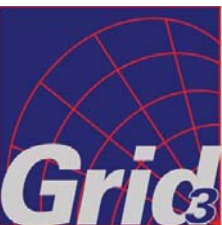


1 to 32 of 32    sort by: Service    entries per page: 100    view: Summary

Service Classifications: CS = Compute Service, SS = Storage Service

Status	Site Name	Jobs	DiskSpace	Service	Location	Facility Information	CPUs
●	ANL_Jazz	17/250	0.2	CS	IL	Jazz	350
●	BNL_ATLAS	239/292	0.1	CS	NY	BNL	20
●	BU_AGT_Tier2	18/32	0.9	CS	MA	BU	32

*c.f. B. Kim et al.,*





Please fill in the form below to open a trouble report with the iGOC.

## Trouble Ticket Information

**Contact Information**

Full Name:

Telephone:

Short Description:

Contact Email:

Address/Location:

**Detailed Description of the Problem:**

OR

Web form to open  
a Trouble Ticket

Or send email to  
[igoc@ivdgl.org](mailto:igoc@ivdgl.org)

Submission of this form will open a ticket at the iVDGL Grid Operations Center. You will be sent a confirmation email and assigned a new ticket number. If you have questions regarding this process or problems using this form please contact the iGOC.

Weekly Archive of Trouble Tickets  
Contact the iGOC via  
Phone: (317)278-9699 or  
Email: [igoc@ivdgl.org](mailto:igoc@ivdgl.org)

